

ABSTRACT OF THE DISCLOSURE

An apparatus, which performs a plasma process on a target substrate by using plasma, includes first and second electrodes in a process chamber to oppose each other. An RF field, which turns a process gas into plasma by excitation, is formed between the first and second electrodes. An RF power supply, which supplies RF power, is connected to the first or second electrode through a matching circuit. The matching circuit automatically performs input impedance matching relative to the RF power. A variable impedance setting section is connected to a predetermined member, which is electrically coupled with the plasma, through an interconnection. The impedance setting section sets a backward-direction impedance against an RF component input to the predetermined member from the plasma. A controller supplies a control signal concerning a preset value of the backward-direction impedance to the impedance setting section.